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SALES hereby certify that annexed is a true copy of the Provisional specification  
in connection with Application No. PQ3341 for a patent by WEEDBUG PTY  
LTD filed on 08 October 1999.

10/070223

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Sixth day of September 2000

LEANNE MYNOTT  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES



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PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:

"APPLICATORS AND APPLICATOR COMPONENTS"

This invention is described in the following statement:

APPLICATORS AND APPLICATOR COMPONENTS

This invention relates to applicators for applying liquids particularly weedicides selectively to undesired plants in a field, garden, crop or the like, and components for such applicators.

Applicators for applying weedicides to crops etc are described in our Australian patent No. 589361. While such applicators are very effective in use, they are more expensive to manufacture and maintain than is desirable. With this in mind, the present invention is aimed at providing applicators and components for applicators which are less expensive to manufacture and result in apparatus which is more reliable and easier to maintain.

With the foregoing in view, the present invention resides broadly in a rotatable applicator head comprising a first part and a second part, the first part being moulded of a plastics material and being disk-like in form with a central recess formed therein, and said second part being secured to said first part to define a liquid storage chamber between said first and second parts for storing a liquid to be applied to the surface of a field, garden or crop, and a plurality of applicator wicks extending through a wall of said recess towards the periphery of said first part and having a portion thereof within said recess, characterised in that said wall is moulded about said plurality of applicator wicks. Preferably, a portion of the first part at or near its periphery is moulded about a portion of each applicator wick to secure them against movement relative to the

first apart during rotation. Intermediate portions of the first part may also be moulded about the wicks for further security if desired. In a particularly preferred form in which each wick terminates adjacent the periphery of the first part, a peripheral portion of the first part is moulded about the end portion of each wick thereby forming a cap so that liquid wicking through the wick during rotation of the applicator head is prevented from flowing out the end of the wicks. In a preferred form said second part includes a Vee-belt pulley integrally moulded therewith for receiving drive from a tractor power Take Off (PTO) or other drive source.

Terms such as vertical, horizontal, upper and lower, are used herein for the purpose of description and illustration of the invention in the position it would normally be used for the application of weedicide to a field unless clearly not appropriate, and are not intended to restrict the scope of the invention to any particular orientation.

In another aspect the invention resides broadly in an applicator, comprising:

- a frame assembly adapted to be attached to or drawn by a vehicle such as a tractor;

- a support shaft secured to said frame assembly and depending vertically, in use, therefrom;

- a storage tank mounted on said frame assembly or adapted to be mounted on the vehicle;

- a rotatable applicator head as previously described mounted on said shaft for rotation relative thereto, said shaft extending into or through said storage chamber in said applicator head and

said shaft having a passage therethrough, said passage being in fluid communication with said storage chamber and said storage tank for supplying liquid to said storage chamber. Preferably, said shaft also includes a second passage therethrough in fluid communication with said storage chamber and adapted to act as a vent passage for venting the storage chamber.

In another aspect, the invention resides broadly in a hand held motor driven applicator including:

- drive means having a drive housing and an output shaft;

- a motor drivingly connected to said drive means;

- a rotatable applicator head having a first part and a second part, the first part being moulded of a plastics material and being disk-like in form with a central recess formed therein, and said second part being secured to said first part to define a liquid storage chamber between said first and second parts for storing a liquid to be applied to the surface of a field, garden or crop, and a plurality of applicator wicks extending through a wall of said recess towards the periphery of said first part and having a portion thereof within said recess, said wall being moulded about said plurality of applicator wicks and there being an access opening in said second part for receiving a supply of liquid;

- an elongate handle operatively connected to said drive housing by which a user may maintain said rotor assembly proximal to the surface of the field, garden or crop, whereupon said application means may apply liquid to selected undesired plants upon contact therewith, and

- a reservoir mounted on said elongate handle or said drive

housing in fluid communication with said storage means for supplying liquid to said storage means via said access opening while said rotor assembly is rotating.

In another aspect, the invention resides broadly in a method of constructing a rotatable applicator head for a motor driven applicator of the type having a first part moulded of a plastics material and being disk-like in form with a central recess formed therein and a plurality of applicator wicks extending through a wall of said recess towards the periphery of said first part and having a portion thereof within said recess, including;

cutting a piece of wick rope to a desired length to extend across a face of said first part;

compressing a portion of the wick rope greater in length than the thickness of the recess wall, and moulding the recess wall about the compressed portion of the wick rope while it is compressed, and

allowing the plastics material to set before releasing the wick rope.

In order that this invention may be more clearly understood and put into practical effect, reference will now be made to the accompanying drawings wherein:

Fig. 1 is a pictorial representation of a tractor mounted applicator according to the invention shown in the in-use attitude;

Fig. 2 is a front elevation of the applicator of Fig. 1 in the same attitude;

Fig. 3 is a pictorial representation of the applicator of Fig. 1 with some of the applicator units in a out-of-use

attitude;

Fig. 4 is a bottom perspective view of a rotor disk component of an applicator unit of the applicator of Fig. 1, with the rope wicks removed for clarity;

Fig. 5 is a bottom plan view of the applicator disk of Fig. 4 also with the wick ropes removed for clarity;

Fig. 6 is a top perspective view of the applicator disk of Fig. 4 also with the wick ropes removed for clarity;

Fig. 7 is a side elevation of the applicator disk of Fig. 4 also with the wick ropes removed for clarity;

Fig. 8 is a pictorial representation of a 1/12 segment of the disk of Fig. 4 with the wick rope moulded in position;

Fig. 9 is a plan view of the segment of Fig. 8;

Fig. 10 is an elevation of the segment of Fig. 8;

Fig. 11a is a plan view of a cap for the recess of the disk of Fig. 4;

Fig. 11b is an elevation of the cap of Fig. 11a;

Fig. 12a is a plan view of a pulley adapted to be mounted to the cap of Fig. 11a;

Fig. 12b is a sectional view of the pulley of Fig. 12a along line 12a-12a;

Fig. 13a is an end view of the mounting shaft on which the rotor units are mounted;

Fig. 13b is a sectional view of the shaft of Fig. 13a along line 13a-13a; and

Fig. 14 is a pictorial representation of a mounting

block by which the shaft of Fig. 13a is mounted to the frame assembly.

The applicator 10 illustrated in the drawings includes a frame assembly 11 adapted to be mounted to the three point linkage of a tractor by the three point linkage mounting frame 12 and includes seven applicator heads 13 each being mounted to a frame unit 14 with three on each side of the centre frame unit 14a. The outermost two units on each side of the centre unit are welded together and are arranged for pivoting up and down movement together for travel as illustrated in Fig. 3 about pivot respective pivot pins 15.

Each applicator head is rotatably mounted on a shaft 17 which depends from a clamp block 18, as more clearly shown in Fig. 14, which in turn is welded to its respective frame unit, the clamp block being of the split type which can be tightened onto the shaft by tightening the two set bolts (not shown) in the holes 19. Thus the shaft can be easily and quickly removed if desired.

Each applicator head 13 includes an applicator disk 21 as shown in Fig. 4 but with the wick ropes moulded thereinto as will be described later, and a top plate 22 as shown in Figs. 11a and 11b. A cup-like recess 23 is formed centrally of the applicator disk and defined by a substantially cylindrical side wall 24 and a base wall 26 with an aperture 27 being provided centrally of the base wall which is adapted to receive therein a bearing and seal by which the applicator head is mounted on the shaft 17 as will be described later. The top cover abuts a shoulder 28 which extends around the perimeter of the recess as shown more clearly



in Fig. 6 and is sonic welded to the applicator disk to form a storage chamber 29 therebetween for liquid chemicals such as weedicide.

As more clearly shown in Figs. 8, 9 and 10, each applicator disk has twelve equally spaced wick ropes 31 moulded therein and extending into the recess 23(which in part defines the liquid storage chamber), the ropes terminating at the periphery of the disk in a moulded cap 32 and being held intermediate their two ends by two moulded bands 33 and 34 as seen in Fig. 9. The disk is manufactured by an injection moulding process and the wick ropes moulded thereinto in the process. In this process, each wick rope is compressed on either side of the recess wall 24 by a predetermined amount and the recess wall is then formed about the compressed portion of the rope. The amount of compression applied to the rope wick determines the cross sectional area of the rope wick over that portion through the wall 24. Thus the wall acts to some extent like a gland and is believed to determine the maximum flow rate of a particular chemical through the wick rope at a particular speed of rotation. A similar process is used to encapsulate the end portion of each wick rope in the end cap 32 shown in Fig. 8 to effectively close the end of each rope wick. However, the supporting bands 33 and 34 are moulded around the wick rope without any compression so that flow therethrough is not restricted. It will be appreciated from the foregoing description that a complete applicator head can be constructed in a very fast simple operation at a very low cost with the rope wicks already mounted therein. While, the applicator disk has been described in its preferred form being

moulded as one piece, it will be appreciated that it could be moulded in a plurality of segments, for example, 1/12 segments which could then be welded together to form a complete disk although it will be appreciated that such a process would not be as efficient.

The pulley 41 illustrated in Figs. 12a and 12b is moulded from a plastics material and is secured to the top cap 22 by four screws (not shown) engaging in the threaded bores 42. However, in another form of the invention, the pulley and the cap are moulded as an integral unit.

As mentioned previously, the support shaft 17 is secured to the frame assembly by the clamp 18 and each applicator head is rotatably mounted on its respective shaft which in turn is mounted to its respective frame unit. As shown in Fig. 3, each shaft extends fully through its respective rotor head and is retained thereon by a washer and nut with a bottom seal and bearing being mounted in the applicator disk abutting a shoulder (not shown) in aperture 27 and a top seal and bearing mounted in the bore 43 of the pulley against shoulder 44. It will be seen from Fig. 13b that the top bearing engages the shaft portion 46 abutting shoulder 47 while the bottom bearing engages shaft portion 48 and the nut is screwed to the shaft end portion 49.

Two bores 51 and 52 extend through the shaft and open at the top 53 where standard hose fittings (not shown) are fitted while at their other ends they open sideways through the shaft for fluid communication with the storage chamber 29. Both bores are connected by hoses (not shown) to a storage tank (not shown) mounted above the frame assembly 11, one hose being a supply hose

connected to the lower part of the tank and connected to bore 52 while the other hose enters the tank above water level and is connected to bore 51 to act as a vent for the liquid storage chamber 29.

The applicator heads are driven by the tractor PTO via a right angle gearbox(not shown) mounted to bracket 20 with Vee-belts being drivingly connected to the output shaft of the gearbox and the centre applicator head as well as the applicator heads on either side which in turn drive the next outer applicator heads and so on as can be seen in Fig. 2.

It will of course be realised that while the foregoing description has been given by way of illustrative example of this invention, all other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as herein set forth.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A rotatable applicator head comprising a first part and a second part, the first part being moulded of a plastics material and being disk-like in form with a central recess formed therein, and said second part being secured to said first part to define a liquid storage chamber between said first and second parts for storing a liquid to be applied to the surface of a field, garden or crop, and a plurality of applicator wicks extending through a wall of said recess towards the periphery of said first part and having a portion thereof within said recess, characterised in that said wall is moulded about said plurality of applicator wicks.
2. A rotatable applicator head according to Claim 1, wherein a portion of the first part at or near its periphery is moulded about a portion of each applicator wick to secure them against movement relative to the first part during rotation.
3. A rotatable applicator head according to Claim 2, wherein each wick terminates adjacent the periphery of the first part, a peripheral portion of the first part is moulded about the end portion of each wick thereby forming a cap so that liquid wicking through the wick during rotation of the applicator head is prevented from flowing out the end of the wicks.
4. A rotatable applicator head according to Claim 1, wherein said second part includes a Vee-belt pulley integrally moulded therewith for receiving drive from a tractor power Take Off (PTO) or other drive source.
5. An applicator, comprising:  
a frame assembly adapted to be attached to or drawn by a

vehicle such as a tractor;

a support shaft secured to said frame assembly and depending vertically, in use, therefrom;

a storage tank mounted on said frame assembly or adapted to be mounted on the vehicle;

a applicator head as previously described mounted on said shaft for rotation relative thereto, said shaft extending into or through said storage chamber in said applicator head and said shaft having a passage therethrough, said passage being in fluid communication with said storage chamber and said storage tank for supplying liquid to said storage chamber.

6. An applicator according to Claim 5, wherein said shaft also includes a second passage therethrough in fluid communication with said storage chamber and adapted to act as a vent passage for venting the storage chamber.

7. A hand held motor driven applicator including:

drive means having a drive housing and an output shaft;

a motor drivingly connected to said drive means;

a applicator head having a first part and a second part, the first part being moulded of a plastics material and being disk-like in form with a central recess formed therein, and said second part being secured to said first part to define a liquid storage chamber between said first and second parts for storing a liquid to be applied to the surface of a field, garden or crop, and a plurality of applicator wicks extending through a wall of said recess towards the periphery of said first part and having a portion thereof within said recess, said wall being moulded about said plurality of applicator wicks and there being an

access opening in said second part for receiving a supply of liquid;

an elongate handle operatively connected to said drive housing by which a user may maintain said rotor assembly proximal to the surface of the field, garden or crop, whereupon said application means may apply liquid to selected undesired plants upon contact therewith, and

a reservoir mounted on said elongate handle or said drive housing in fluid communication with said storage means for supplying liquid to said storage means via said access opening while said rotor assembly is rotating.

8. A method of constructing a rotatable applicator head for a motor driven applicator of the type having a first part moulded of a plastics material and being disk-like in form with a central recess formed therein and a plurality of applicator wicks extending through a wall of said recess towards the periphery of said first part and having a portion thereof within said recess, including;

cutting a piece of wick rope to a desired length to extend across a face of said first part;

compressing a portion of the wick rope greater in length than the thickness of the recess wall, and moulding the recess wall about the compressed portion of the wick rope while it is compressed, and

allowing the plastics material to set before releasing the wick rope.

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Dated this 8<sup>th</sup> day of October 1999  
WEEDBUG PTY LTD  
by their Patent Attorneys  
AHEARNES

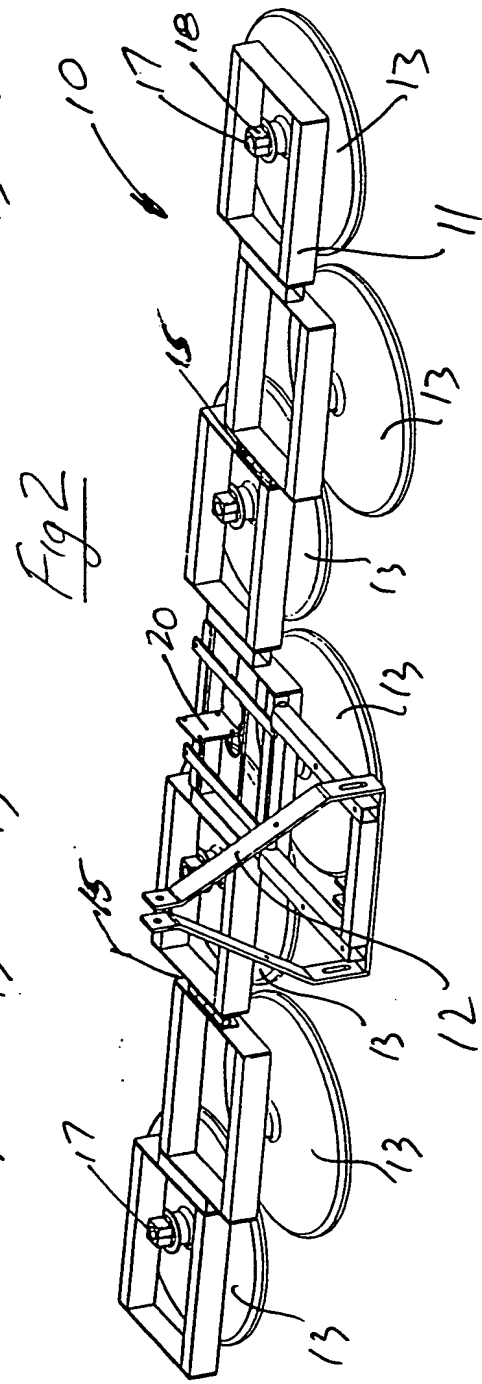
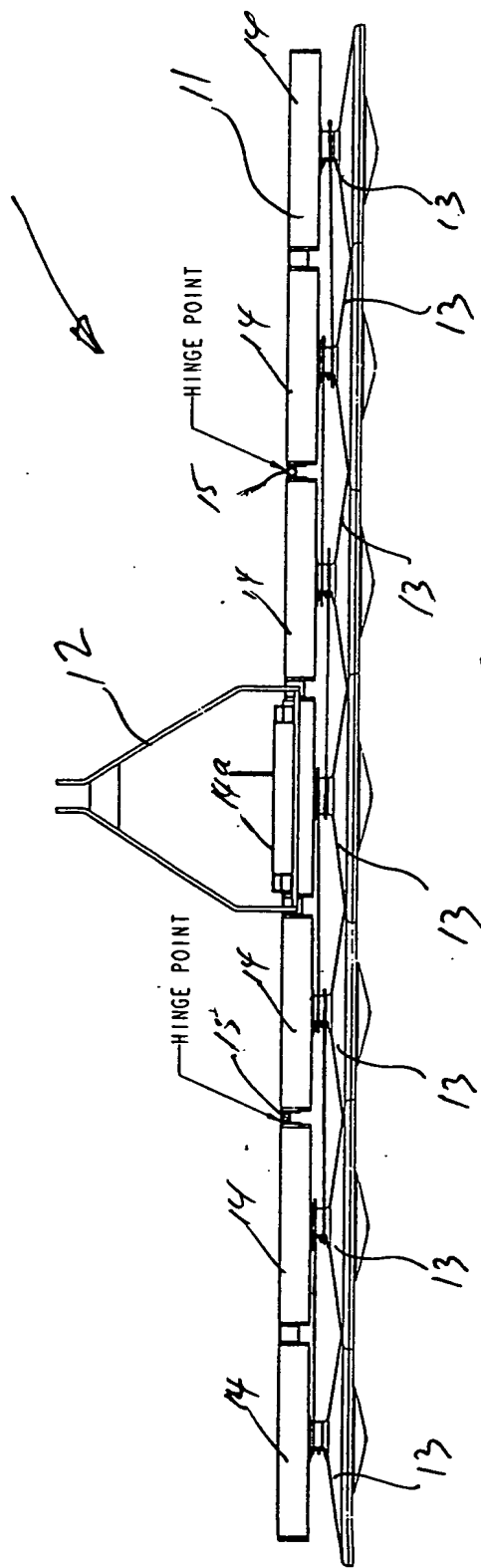


Fig. 1

Fig. 2



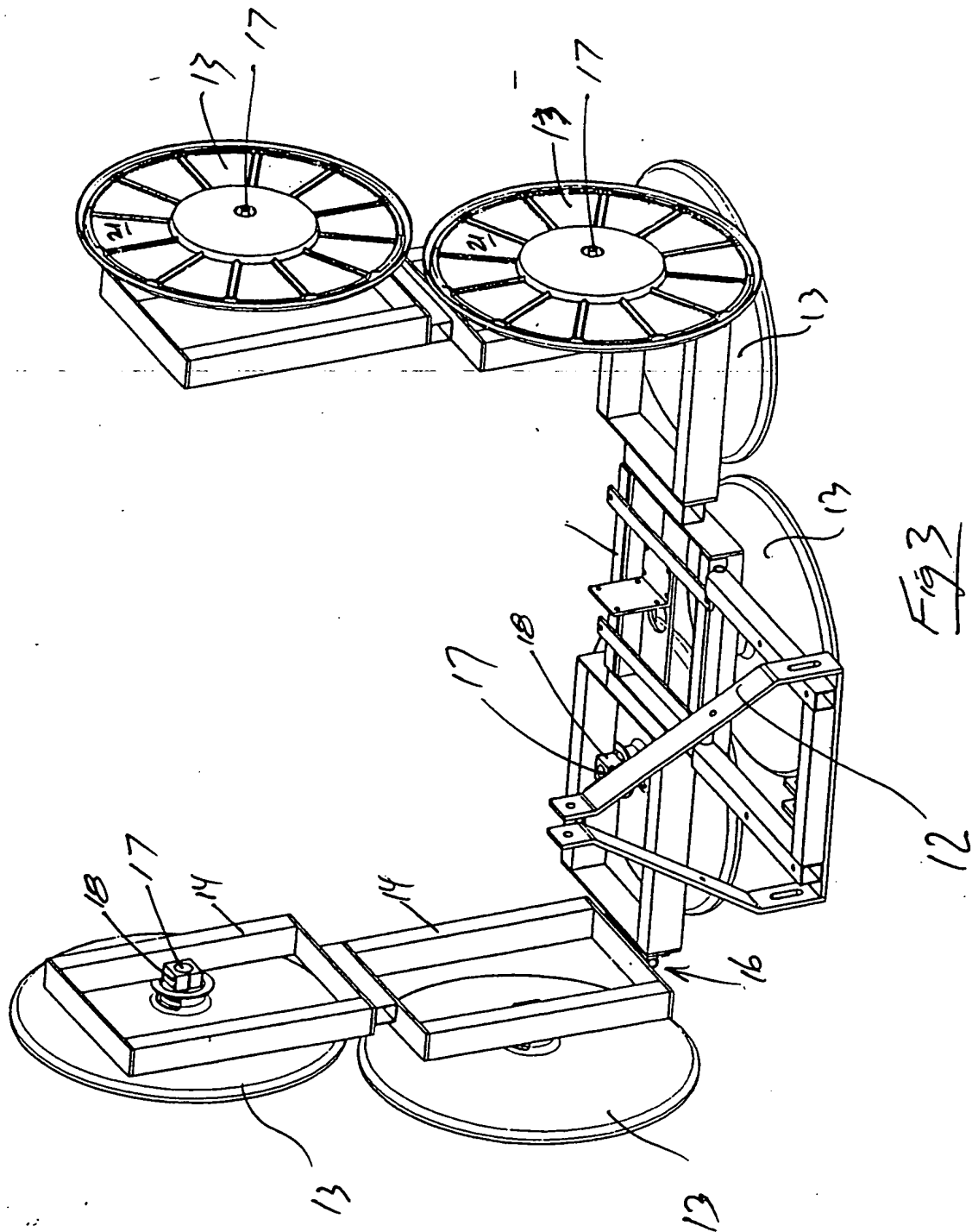
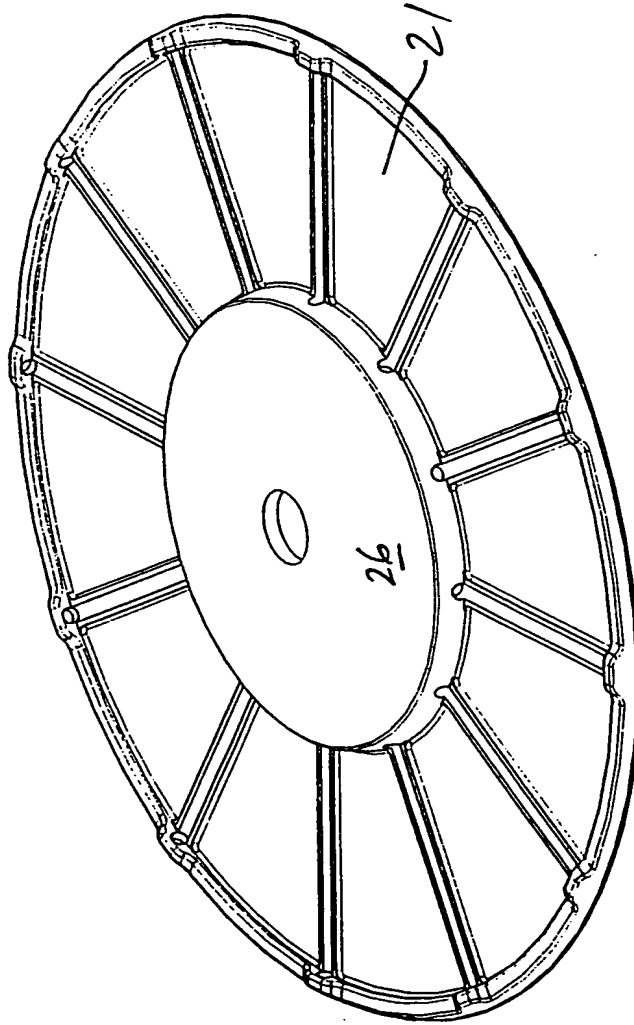


Fig 3



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BOTTOM VIEW

Fig 4

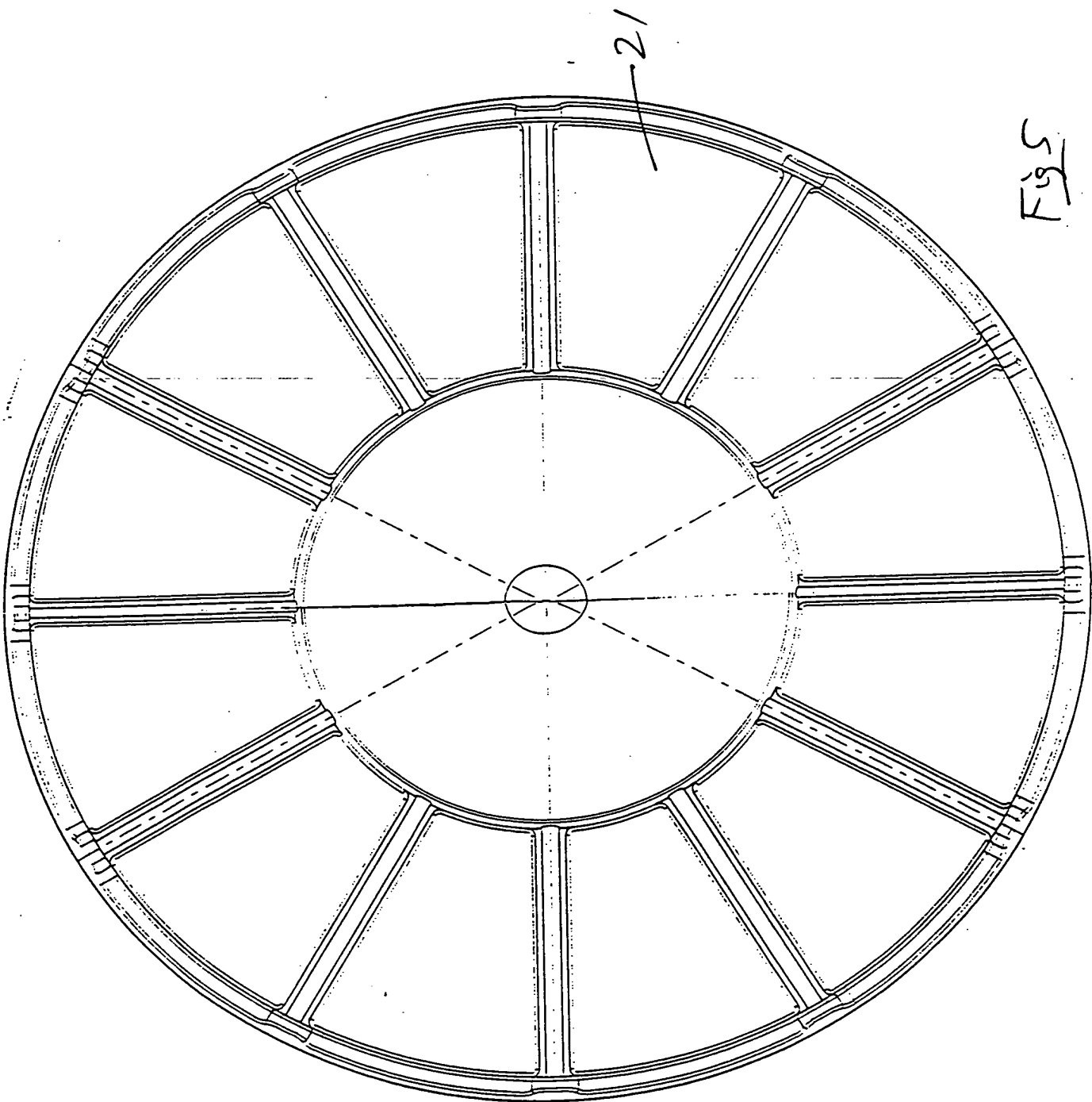
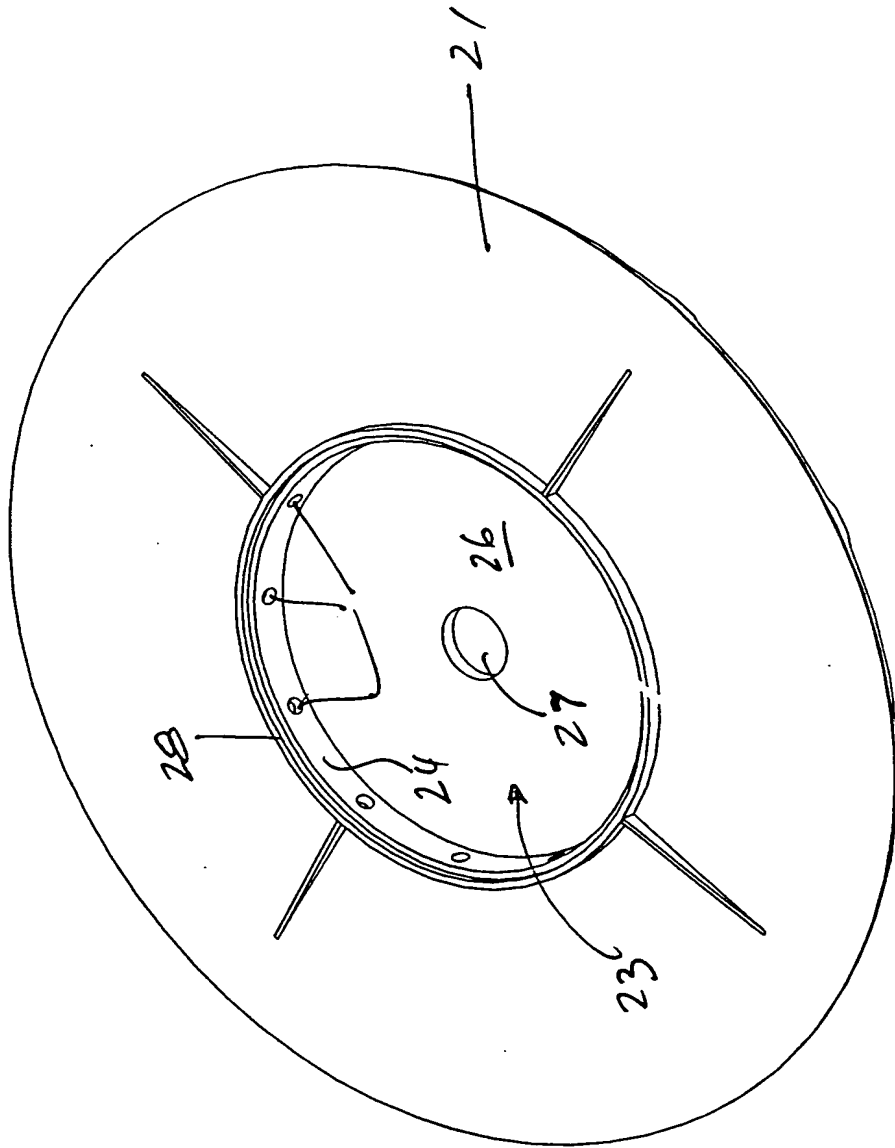


Fig 5

Fig 6



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TOP VIEW

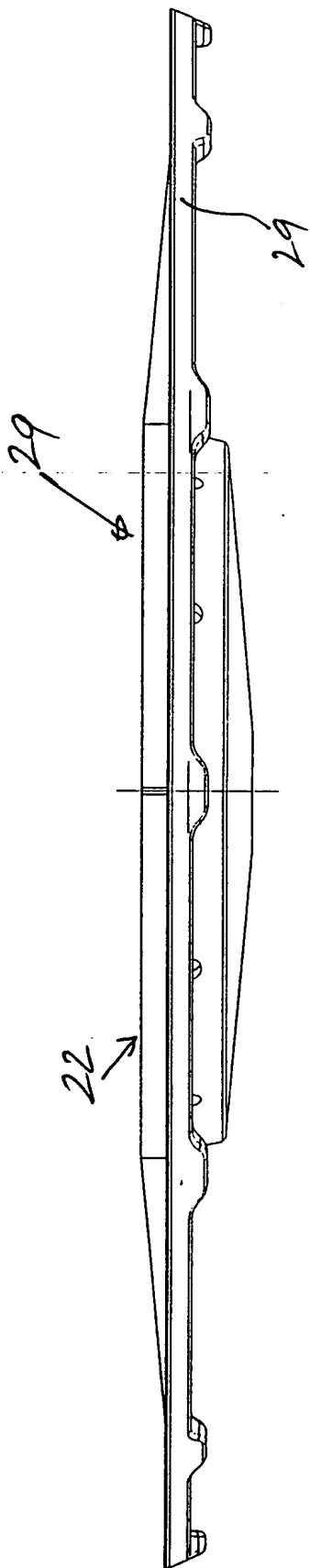
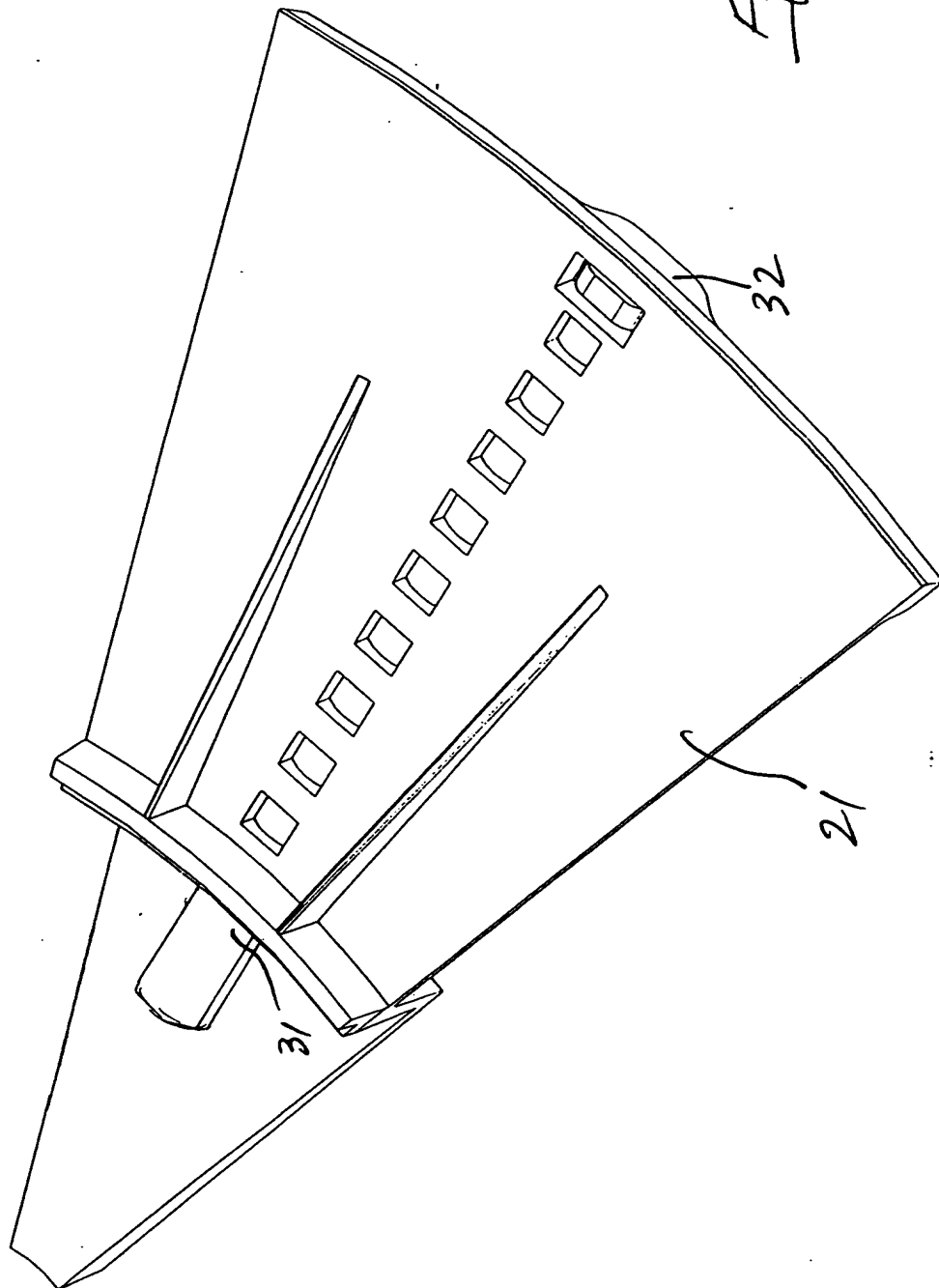
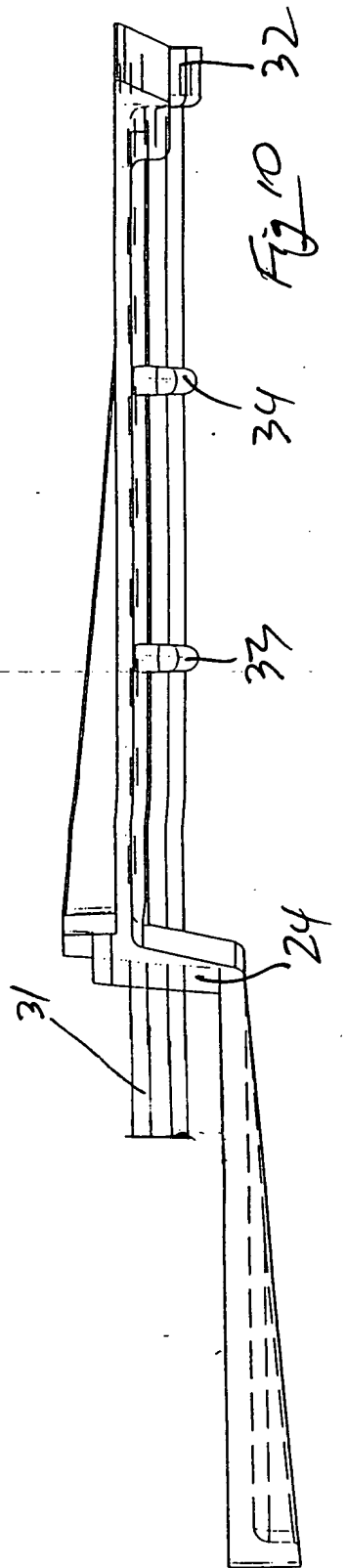
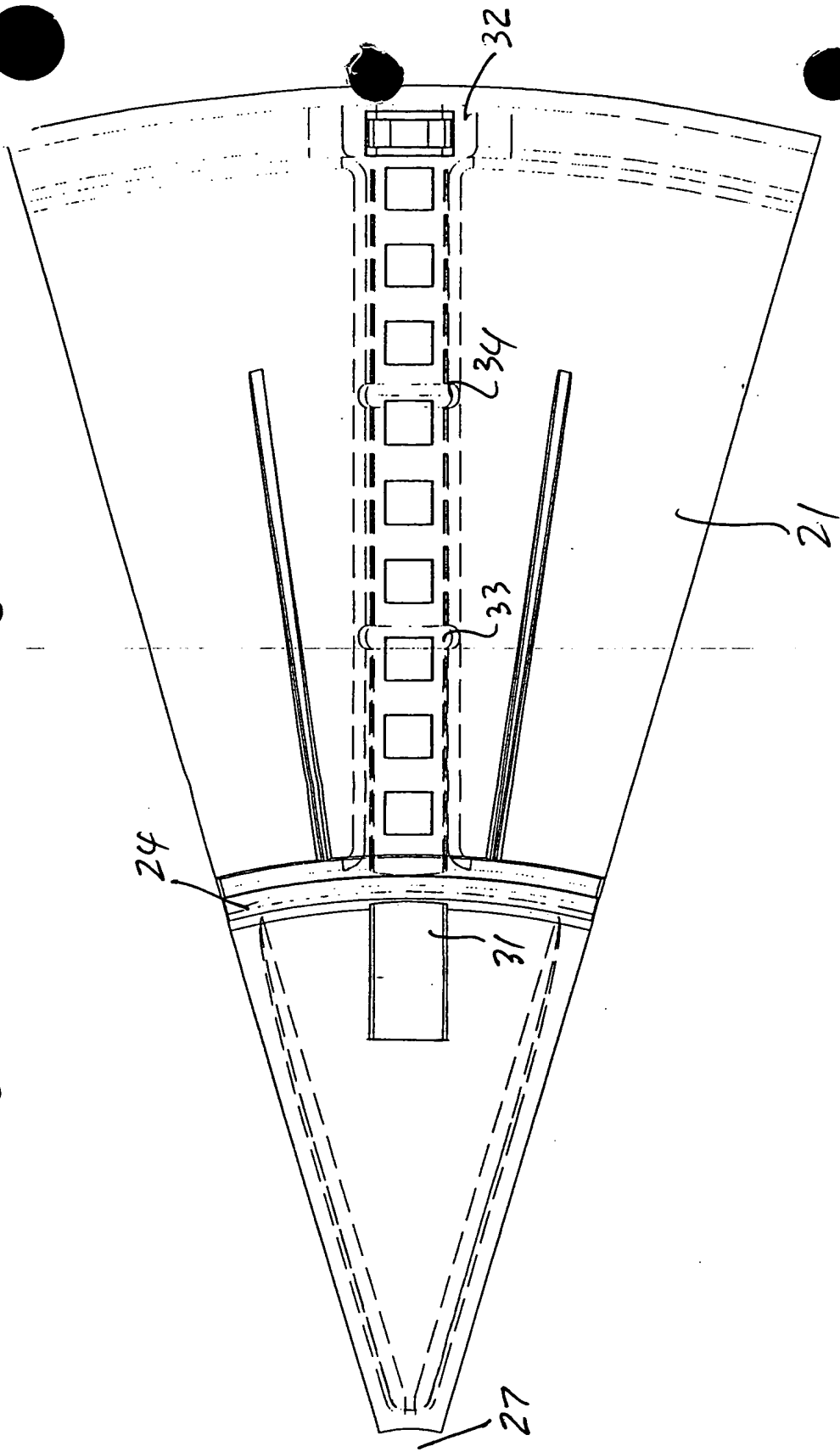


Fig 2

Fig 8





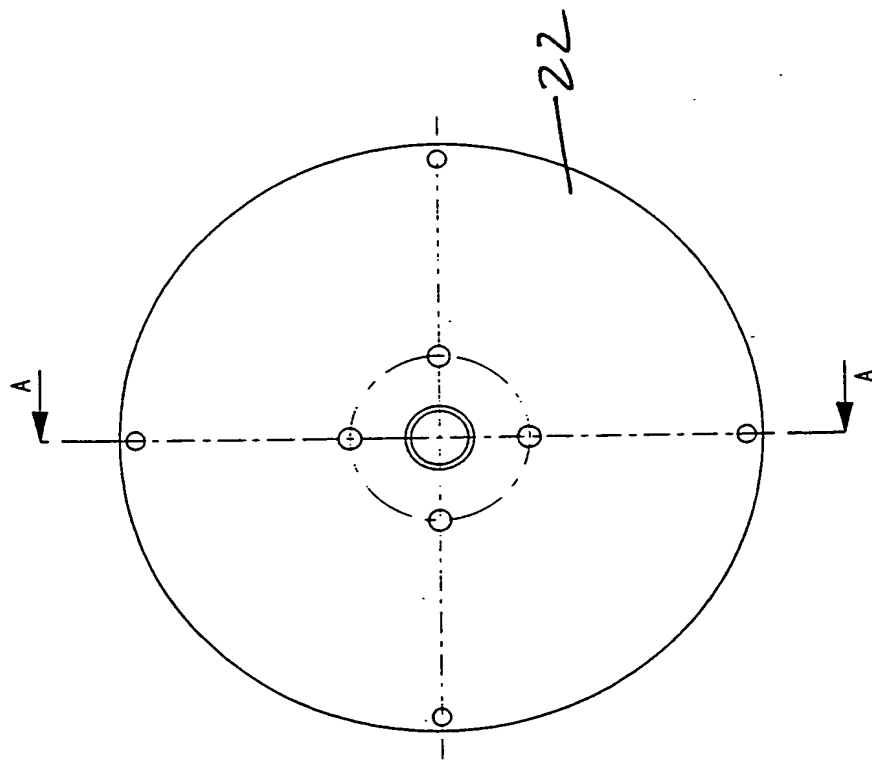


Fig 11a



Fig 11b



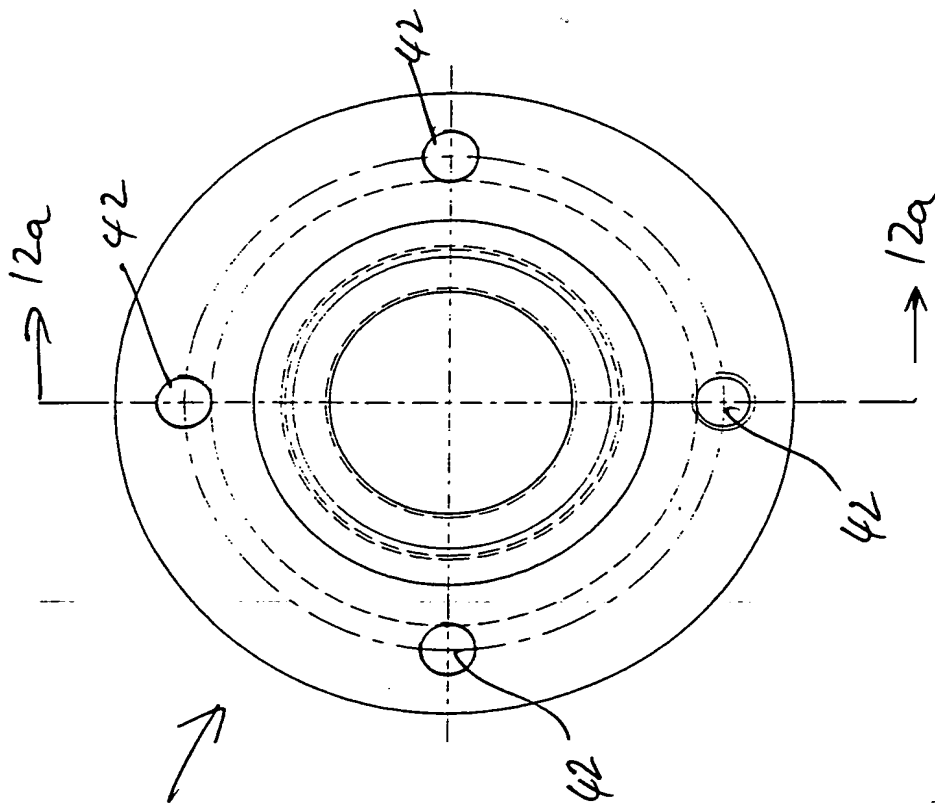


Fig 12a

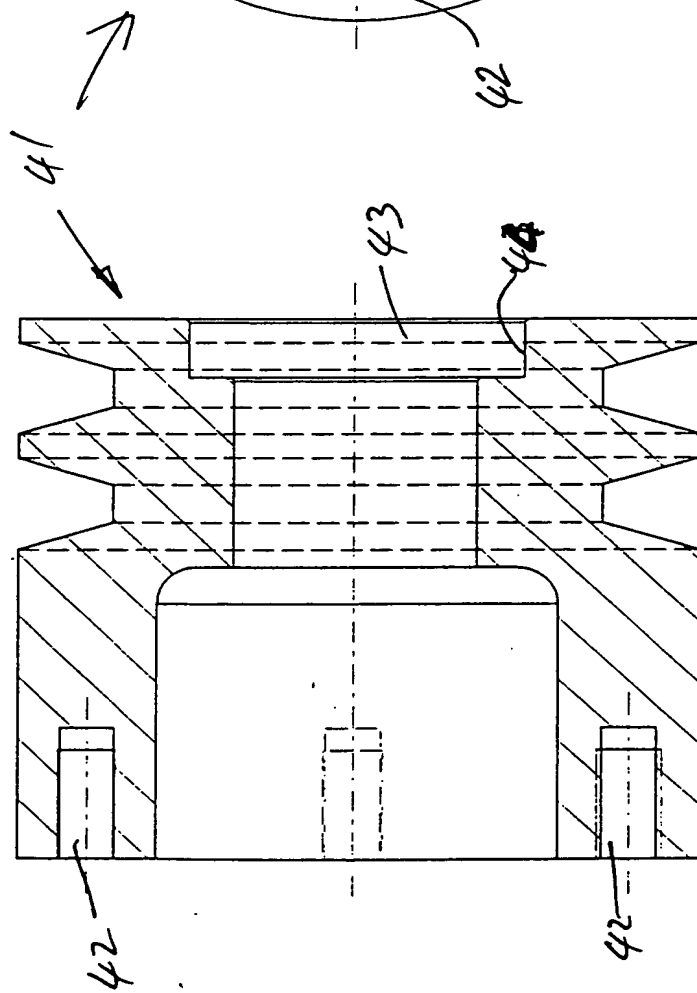


Fig 12b

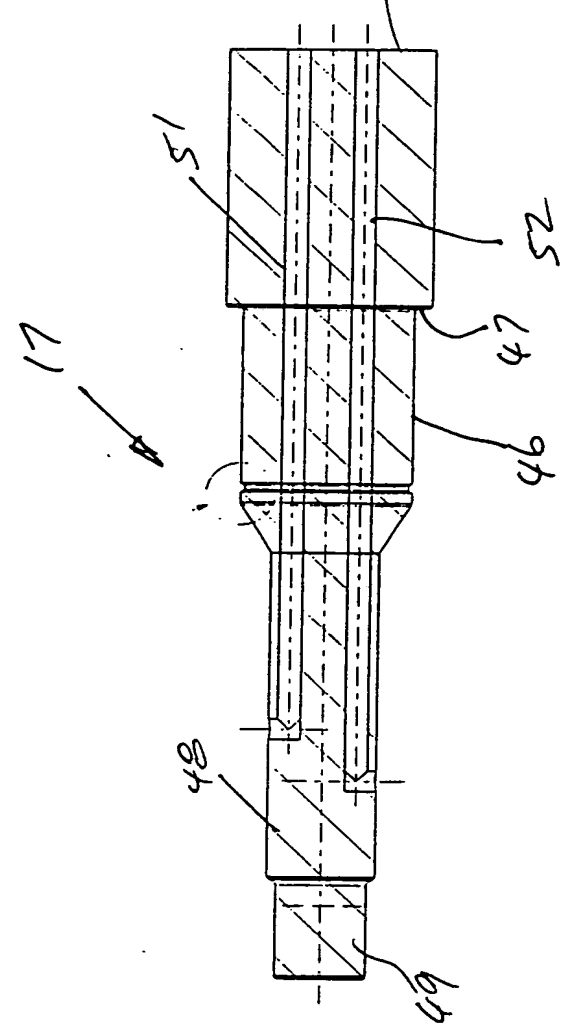
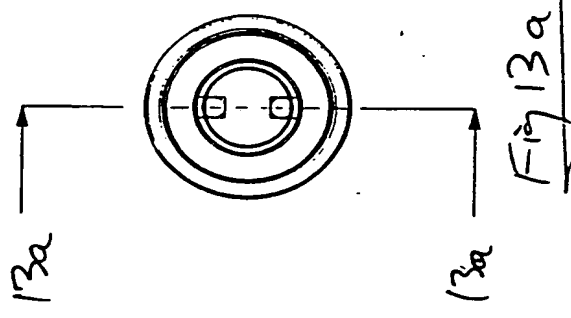
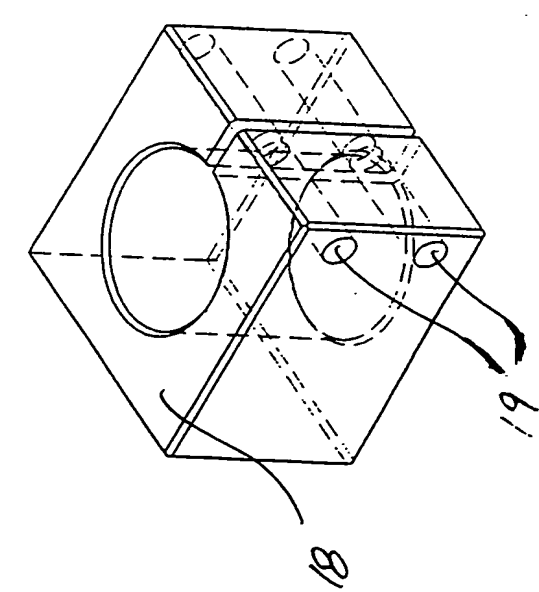


Fig 13b



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